How the prison environment can support recovery

Moran, Dominique

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Dr Dominique Moran *is a Professor of Carceral Geography at the School of Geography, Earth and Environmental Sciences, University of Birmingham (d.moran@bham.ac.uk)*

Since addiction is not 'caused' by one single factor, but instead develops from the interaction of multiple influences, including biological, psychological, and social and environmental factors,[1] it follows that 'environment' should play a role in *recovery*. But what is usually meant by 'environment' is things like family, peer group, work or community—(with the associated recommendation to 'get away from' bad influences that have previously supported the development of addiction). Environment in the sense of the nature of the *spaces* inhabited by those seeking to recover from addiction, is rarely considered—and even if it was, the same advice to 'get away' would be of little benefit to prisoners who have relatively little control over the nature of their environment.

In this paper I ask whether there are certain types of environment—and by that I mean types of physical *spaces*—that might support recovery in prison. This is an important question to address, at a time when the quality of some prison environments has been criticised in inspection reports, when substance misuse is a grave challenge for the prison system, and when there a live debate about what kinds of *new* prisons should be built to deliver the government's plans for a modern prison estate. It is particularly important for the many prison management teams seeking to use their limited resources judiciously to make improvements to their own prison environments. They all need to know what 'works', and that means answering a very challenging question about what evidence there is that certain types of environmental changes will support desired outcomes. In terms of the *overall* purpose of prisons to enable rehabilitation, this remains an area of active research, but in relation to the specific issue of addiction recovery, there are some research findings that provide a steer.

In this paper, I will consider two types of evidence, both *from* prisons and relevant to them. First, work from healthcare facilities (such as hospitals and other clinical settings) which considers the types of environments which support addiction recovery outside prison. Second, research findings from (the very few) prison-based studies into the effects of environment on addiction recovery, and from the growing body of prison-based research which seeks to 'test' the transferability of findings from the healthcare sector to the custodial setting.

First, a quick note. Whilst other contributors to this special issue are grappling with the problematic notion of 'recovery', for the purposes of this paper, my understanding of this term is informed by its medical use connoting a return to health following trauma or illness.[2] This means that my focus here is on the types of environment that support recovery in this sense.

Recovery and Environment

The question about what kind of environment fosters recovery from addiction is part of a much wider query about the type of environment that supports recovery from illness and trauma in general—and this is a question which has preoccupied researchers for some time. Much of their work was stimulated by a 1984 study of the positive effects of views of nature on patients' recovery from surgery,[3] and numerous subsequent studies have demonstrated the effects of a variety of built environment features, such as acoustics, ventilation, layout, and natural lighting, on health and wellbeing, largely in healthcare facilities. In these studies, the most robust data often relates to contact with the natural environment, which is often identified as a health-enabling feature. Within this wider body of work, very few studies focus *solely* on addiction recovery as the *specific* outcome of interest—but in those that do, findings are in line with those for other health outcomes. In other words, the same types of environment that support health and wellbeing in general, also support addiction recovery. And it is worth

1. Glantz,M. D., & Pickens, R.W. (1992). Vulnerability to drug abuse. Washington, DC: American Psychological Association.
2. White, W. L. (2007). Addiction recovery: Its definition and conceptual boundaries. Journal of substance abuse treatment, 33(3), 229-241.
3. Ulrich, R.S., (1984). View through a window may influence recovery from surgery. Science 224 (4647), 420–421.

making clear at the outset that although the specific focus here is on environments that support recovery in imprisoned populations, the health wellbeing of prison *staff* (who experience high levels of stress)[4] is also an important consideration.

This makes intuitive sense when we consider that a healing environment 'works' by helping patients cope with the stress that accompanies illness, thus supporting clinical recovery. Reductions in stress and an enhanced feeling of calm are at the root of this beneficial effect, and there are multiple ways in which this effect is delivered—some of which have particular relevance for addiction recovery.

Noise—the presence of unwanted sound—is a key factor.[5] Noise is not just an annoyance; it also has the potential to affect the healing process through disruption of sleep.[6] Because of the way in which the brain processes sound, certain types of noises may also lead to confusion and stress. If tranquil environments enable calmness and reflection, where listeners are in control of their own mind-states (i.e. can choose what to think about, and whether and how to concentrate on it), then environments that feature annoying or startling sounds (such as bleeps and alarms, banging and shouting) force an alertness and attentiveness that prevent such self-selective behaviour, and lead to poor health outcomes.[7] In other words, constant harsh or 'alert' sounds put the mind into a 'fight-or-flight' mode which is itself stressful, and which prevents the listener from being able to get into a calm and reflective state of mind. So, acoustic treatments (such as sound-absorbent wall panels), which reduce the harshness of sound and enable relaxation and sleep, as well as measures to reduce the production of harsh or alert sounds in the first place, all help in fostering calmness, enabling better communication, and improving health outcomes.[8]

Natural light in the daytime, and good dark at night, both help in regulating circadian rhythms (natural patterns of sleep and wakefulness) and enabling restful sleep.[9] Limiting exposure to natural daylight (e.g. through poor indoor natural lighting, or lack of access to the outdoors) and unnecessary exposure to light at night (e.g. through 24-hour artificial security lighting, or lack of curtains) both interrupt circadian rhythms and disrupt sleep. Sleep itself is health-enabling,[10] whereas sleep deprivation is a chronic stressor contributing to cognitive problems, and increasing the likelihood of illness.[11] So, measures which enable access to natural light in the daytime, and which reduce unnecessary light exposure at night, both enhance sleep, with its associated benefits, and reduce the additional stress caused by sleep deprivation—stress which would then increase the need for another type of 'calming' intervention.

Sleep disturbance is particularly common amongst individuals in recovery, and for individuals in recovery from alcohol addiction

Although noise control and natural light/dark are important for everyone, they have particular relevance for those in addiction recovery. Sleep disturbance is particularly common amongst individuals in recovery, and for individuals in recovery from alcohol addiction, it can precipitate relapse.[12] Substance misuse also has a negative effect on circadian rhythms, which may even disappear in extreme cases. It is thought that addiction recovery support should try to establish regular time patterns of waking and sleeping, and that light therapy may prevent relapse.[13] So, any interventions which support good light and dark, and which protect sleep, are likely to be of particular benefit.

4. Steiner, B., & Wooldredge, J. (2015). Individual and environmental sources of work stress among prison officers. Criminal Justice and Behavior, 42(8), 800-818.
5. Devlin, A. S., & Arneill, A. B. (2003). Health care environments and patient outcomes: A review of the literature. Environment and behavior, 35(5), 665-694.
6. Simpson, T., Lee, E. R., & Cameron, C. (1996). Relationships among sleep dimensions and factors that impair sleep after cardiac surgery. Research in Nursing and Health, 19, 213-223.
7. Andringa, T. C., & Lanser, J. J. L. (2013). How pleasant sounds promote and annoying sounds impede health: A cognitive approach. International journal of environmental research and public health, 10(4), 1439-1461.
8. Yoder, J. C., Staisiunas, P. G., Meltzer, D. O., Knutson, K. L., & Arora, V. M. (2012). Noise and sleep among adult medical inpatients: far from a quiet night. Archives of internal medicine, 172(1), 68-70.
9. Wright Jr, K. P., McHill, A. W., Birks, B. R., Griffin, B. R., Rusterholz, T., & Chinoy, E. D. (2013). Entrainment of the human circadian clock to the natural light-dark cycle. Current Biology, 23(16), 1554-1558.
10. Alvarez, G. G., & Ayas, N. T. (2004). The impact of daily sleep duration on health: a review of the literature. Progress in cardiovascular nursing, 19(2), 56-59.
11. McEwen, B. S. (2006). Sleep deprivation as a neurobiologic and physiologic stressor: allostasis and allostatic load. Metabolism, 55, S20-S23.
12. Friedmann, P. D., Herman, D. S., Freedman, S., Lemon, S. C., Ramsey, S., & Stein, M. D. (2003). Treatment of sleep disturbance in alcohol recovery: a national survey of addiction medicine physicians. Journal of addictive diseases, 22(2), 91-103.
13. Adan, A. (2013). A chronobiological approach to addiction. Journal of Substance Use, 18(3), 171-183.

Natural daylight/dark, and a gentle auditory environment (or 'soundscape') are characteristics of natural environments, and contact with nature is perhaps the environmental factor for which there is the most persuasive body of evidence in relation to human health and wellbeing. Across a wide range of studies, research has found that access to nature reduces anxiety, increases life satisfaction, reduces aggression and ADHD symptoms, increases prosocial behaviour, lowers blood pressure, and improves post-operative recovery, pain control, immune function and general health.[14] Accordingly, these findings have underpinned the inclusion of gardens, and large windows overlooking them, into the design of hospitals and healthcare facilities,[15] and effective interventions for addiction recovery frequently involve 'wilderness' and/or gardening activities in which contact with the natural environment is considered a key element of the therapeutic programme.[16]

In addition to these factors, a study of 'sober living environments' provided for free citizens seeking to overcome addiction found that a sense of 'home' (achieved through soft furnishings, potted plants, bedside tables, carpets, and so on) produced calming and reassuring environments[17], perhaps enabling them to feel closer to a sense of 'home' than would a conventional 'institutional' setting. A study of a substance abuse treatment facility for women found that colourful, light and quiet spaces were valued by residents.[18]

In summary, whatever the precise details, or the mechanisms through which they take effect, the beneficial outcome of various therapeutic environmental elements is that they foster calmness, and reduce levels of stress and tension, which in turn support recovery from illness—or from addiction.

Across a wide range of studies, research has found that access to nature reduces anxiety, increases life satisfaction, reduces aggression and ADHD symptoms.

Recovery and Environment in Prison

Such longstanding research into health-enabling environments has enabled the 'evidence-based design' of healthcare facilities which ensures that, as far as possible, hospitals and other facilities provide surroundings which support patients' clinical recovery. However, the relative lack of comparable research in prisons (coupled with a reluctance to consider them to be 'therapeutic' rather than 'punitive' settings) means that such design input is poorly developed in this sector. Put another way, because there has been little political appetite for the results of such research, we have much less direct evidence of the beneficial effects of natural light, acoustic treatments and so on in prisons than in hospitals, hence prisons are rarely designed with these factors in mind. However, given the similarities between these two types of setting (in that both prisons and hospitals are large 'institutional' buildings, with overnight residents, operating around the clock) it is quite likely that the same environmental elements that support health and clinical recovery—including addiction recovery—in healthcare facilities would also be effective in prisons. A growing body of academic research is currently focused on understanding the transferability of such research to prisons, and in the remainder of this paper I will briefly explore what we know so far, and what such a transfer of knowledge might mean.

Building on a 1981 paper[19] which reported fewer sickness calls made by prisoners with a view of nature from their cell, studies in the UK, US and elsewhere are now trying to establish whether the same calming effects of therapeutic environmental elements found in healthcare facilities—particularly access to nature—are also to be found in prisons. Although their studies do

14. See Frumkin, H., Bratman, G.N., Breslow, S.J., Cochran, B., Kahn Jr, P.H., Lawler, J.J., Levin, P.S., Tandon, P.S., Varanasi, U., Wolf, K.L. and Wood, S.A., 2017. Nature contact and human health: A research agenda. Environmental health perspectives, 125(7) for a summary of findings.
15. Sachs, N. A. (2018). Designing for Public Health With Healthcare Design Part II: Design. Health Environments Research & Design Journal 11(3) 17-21.
16. Aslan, L. (2016). A Qualitative Evaluation of the Phoenix Futures Recovery Through Nature Program: A Therapeutic Intervention for Substance Misuse. Journal of Groups in Addiction & Recovery, 11(2), 93-108; Easy, F., & Naseri, G. (2015). A study on the effect of the components of physical environment on patient satisfaction in drug rehabilitation centers. Indian Journal of Science and Technology, 8(28) 1-8.
17. Ferrari, J. R., Jason, L. A., Sasser, K. C., Davis, M. I., & Olson, B. D. (2006). Creating a Home to Promote Recovery: The Physical Environments of Oxford House. Journal of Prevention & Intervention in the Community, 31(1-2), 27-40.
18. e.g. Grosenick, J.K. and Hatmaker, C.M. (2000), Perceptions of the importance of physical setting in substance abuse treatment, Journal of Substance Abuse Treatment 18, 29 39.
19. Moore, E. O. (1981). A prison environment's effect on health care service demands. Journal of Environmental Systems, 11, 17-34.

not *directly* test effects on addiction recovery, they *are* interested in the potential for the prison environment to produce the calming, stress-reducing effects that are known to support it.

Good dark and natural daylight, and control of noise, are important for health and wellbeing, and are known to be of particular importance in addiction recovery. They are also likely to be extremely challenging to deliver in prison. Many observers have noted that prisons in a range of contexts lack natural light, with windows often high in the walls, barred, and looking onto dark or shaded areas.[20] Researchers stress that prison 'soundscapes' are complex—they are more than just 'noisy' places, and prisoners should be considered active and interested interpreters of sound, who use and work with sound in significant ways to manage their daily lives.[21] But still, they (as well as prison staff) are subjected to harsh acoustic environments in which alarms, clanging doors, rattling keys and shouted communication reverberate off hard surfaces, making quiet conversations almost impossible, and making it difficult to quickly identify the source of particular sounds.[22] Several studies have found hearing loss amongst prisoners, and have suggested that prisons' auditory environments would be very challenging for those with hearing deficits.[23] Although no study has specifically isolated the effects of either light or sound on prisoners' wellbeing—whether in general or in relation to addiction recovery, previous research has shown that both noise and unnecessary light disturb prisoners' sleep—especially if (like those recovering from addiction) they *already* have trouble sleeping.[24]

For light/dark and noise, the lack of prison-based research means that in terms of understanding the effects of these environmental factors on addiction recovery, we can only make educated guesses. However, extrapolating from research in healthcare facilities, and given the specific needs of those recovering, it is safe to say that prison environments which provide good daylight, and good dark at night, and in which the harshness of the auditory environment is reduced, would be best for supporting recovery.

In relation to the beneficial effects of access to nature, which have been so comprehensively established in healthcare contexts, there is a more robust evidence base for transferability to the custodial context. Recent prison-based research suggests that the calming, de-stressing effects of nature contact which are observed in healthcare facilities, *are* also found in prisons. A recent comparative study[25] found that in a UK facility which lacked accessible green spaces, prisoners reflected on their potential benefits:

> *You don't necessarily need to see the outside world, but something like some nature outside, what a difference it makes, to see birds or that and squirrels flying up in the trees.*

Recent research suggests that calming, de-stressing effects of nature contact are found in prisons.

Two prisoners talked about the relative absence of grass, and the inability to touch grass:

> *I find it weird to feel it, if I touch it or anything like that. You're not used to touching it now. It'd be odd to get the feeling of lying on grass. It sounds stupid but … But even just feeling it…. just the feeling of grass on your hands. I can't remember what that feels like.*

> *… we've just got tarmac and big high fences. And even the grass, even if you just got to lie on the grass. I don't know, there's just something decent about lying in some grass.*

Another, who reflected on previous experiences in other custodial facilities, explained the impact of having access to green spaces when these had previously been unavailable:

20. E.g. Stern, V. (2001). Problems in prisons worldwide, with a particular focus on Russia. Annals of the New York Academy of Sciences, 953(1), 113-119; Mazuch, R., & Stephen, R. (2005). Creating healing environments: Humanistic architecture and therapeutic design. Journal of Public Mental Health, 4(4), 48-52.
21. Rice, T. (2016). Sounds inside: prison, prisoners and acoustical agency. Sound Studies, 2(1), 6-20.
22. https://www.dbxacoustics.com/acoustic-design-in-prisons/ accessed 15.10.2018.
23. E.g. Murray, N., Butler, T., & LePage, E. (2004). Hearing health of New South Wales prison inmates. Australian and New Zealand journal of public health, 28(6), 537-541; McRandle, C. C., & Goldstein, R. (1986). Hearing loss in two prison populations. Journal of Correctional Education, 147-155.
24. Elger, B. S. (2009). Prison life: Television, sports, work, stress and insomnia in a remand prison. International Journal of Law and Psychiatry, 32(2), 74-83.
25. Data presented are from Moran, D., & Turner, J. (2018). Turning over a new leaf: The health-enabling capacities of nature contact in prison. Social Science & Medicine. Early Online at https://www.sciencedirect.com/science/article/pii/S0277953618302752.

I was sitting at the window… And someone said to me, '*What are you doing?*' *I said* '*I'm smelling the grass, which I haven't smelt for like two years', just a simple thing like grass on the ground.*

In the comparator Nordic prison, where green spaces were available, both prisoners and staff felt the benefits, and articulated their calming effects. As one staff member put it:

…when I either am outside walking because I have to go get something or someone or following somebody to a visitor, or just having my break, stepping out for five minutes to clear my head, trees, the cleanness… It feels more calming.

Another recent study at a UK prison studied the effects of nature contact in the form of outdoor green spaces and whole-wall photographic images of the natural environment. It found that in an otherwise stressful context, such elements were self-reported to increase feelings of calm, and the ability to reflect.[26]

For prisoners recovering from addiction, there is also evidence of the benefits of nature contact. A Horticultural Therapy Program 'Gardening to be Drug-Free', at Patuxent Institution in Maryland, U.S., combined therapy groups with organic gardening activities in an attempt to 'show offenders the connection between growing plant life chemical-free and keeping their own bodies chemical-free'.[27] Another study of a prison gardening programme in San Francisco suggested that it improved psychosocial functioning, reducing risk taking and depression, and lowered post-custody substance abuse.[28] Studies such as these specifically consider the effects of gardening or horticultural programmes which involve extensive contact with nature, rather than the effects of the *presence* of nature—that is there simply *being* grassed areas, trees, planted borders and so on in prison. However, it is self-evidently the case that such programmes cannot take place without prisons having suitable green areas in which to host them, and as the words of prisoners quoted above indicate, the wider prisoner population is also likely to benefit.

For prisoners recovering from addiction, there is also evidence of the benefits of nature contact.

Summary

It is perhaps intuitively clear to anyone living or working in prison that the nature of the prison environment affects the wellbeing of those within it—whether or not they are struggling with addiction. Although this may seem an obvious point, establishing exactly *how* the environment matters, and therefore how it ought to be altered or redesigned, is a question which preoccupies many researchers, myself included. There are vital issues at play here in terms of financing, security, design and commissioning processes, and the balance between punishment and rehabilitation in relation to the overall 'purpose' of imprisonment, all of which affect decision-making processes and therefore the nature of the places we build to incarcerate.[29] That the nature of a built environment matters for those within it has long been appreciated in healthcare contexts, and as a result, in this sector evidence-based design draws on research findings which demonstrate the significance of nature contact, good light and dark, and noise control, amongst a range of environmental factors. Perhaps because seeing prisons as similarly 'therapeutic' settings is more ideologically challenging, and hampered by a lack of studies testing the validity of the findings of such research in prisons, custodial design lags some way behind.

Considering the particular needs of prisoners in recovery arguably closes the gap between these two contexts. Evidence from healthcare research suggests that although those tackling substance misuse benefit from the same environmental factors known to support health outcomes in general, the particular challenges they face mean that protection of sleep is especially beneficial, and this can be supported through maintaining circadian rhythms through access to daylight, and good dark at night, and managing noise, as well as through provision of opportunities for nature

26. Moran, D (in review) Back to nature? Attention Restoration Theory and the restorative effects of indirect and vicarious nature contact in prison.
27. Richards HJ, Kafami DM (1999) Impact of horticultural therapy on vulnerability and resistance to substance abuse among incarcerated offenders. Journal of Offender Rehabilitation 29: 183–193.
28. Rice JS, Lremy L (1998) Impact of horticultural therapy on psychosocial functioning among urban jail inmates. Journal of Offender Rehabilitation 26: 169–191.
29. Moran, D., Turner, J., & Jewkes, Y. (2016). Becoming big things: Building events and the architectural geographies of incarceration in England and Wales. Transactions of the Institute of British Geographers, 41(4), 416-428.

contact, through outdoor green spaces which can be viewed through windows and encountered in person, and nature imagery.

It is worth noting that the effects of environmental factors that support addiction recovery are by no means limited to this group—and neither are they limited to prisoners. Prison staff spend extended periods of time at work, and they would also benefit, both from the environmental factors themselves, from being able to communicate more effectively with recovering prisoners in calmer, less noisy and less tense environments. Those dealing with substance misuse may derive particular benefits, but recent prison-based research suggests that, especially in relation to nature contact, increased feelings of calm, and a lower-stress environment, are likely to benefit the wider community of prisoners and prison staff, and support improvements in wellbeing right across prison establishments. If stress is a trigger for violence, then a calmer and more tranquil prison environment would not only support inhabitants' recovery, but could also support their wider wellbeing, and their safety.

What next?

With all of this in mind, what could prison management teams actually do about the physical spaces of their prisons, to support recovery (and the wellbeing of prisoners and staff more generally)? As the research findings above suggest, changes to key aspects of the environment can make a real and meaningful difference.

In relation to noise, acoustic wall treatments to deaden reverberation are very expensive (and are ideally included at design stage). Addressing the source of noise is much cheaper—and very effective. Few prisons may be in a position to move from bunches of jangling keys to quieter electronic keytag systems, but there are other practical measures to reduce the frequency or harshness of 'alert' sounds. Earpieces worn with prison radios change the prison soundscape (as well as restricting critical information to those who really need to hear it). Doors and gates do not always need to be slammed with a metallic 'clang'. In something of a virtuous circle, removing these characteristic 'prison sounds' reduces the need to shout over them, and the resulting changes both to the 'feel' of a prison, and to the types of conversation that become possible within it, are immediately noticeable.

In relation to good light and dark, provision of adequate in-cell curtains is an effective measure, and consideration could also be given to how much artificial light is minimally necessary at night. Nature contact is very important for wellbeing, and every opportunity for 'greening' of prison environments should ideally be taken—whether this means installing 'immersive' whole-wall images of natural landscapes within accommodation units, or introducing vegetation such as grass, shrubs and trees, wherever possible. Green spaces provide visual interest and attract wildlife, and birdsong is a key element of therapeutic soundscapes. Anecdotally, although security is of prime concern, such environmental features are rarely vandalised, and the weight of evidence suggests that, for the sake of their wellbeing, no prisoner (and indeed no member of prison staff) should be deprived of the sight, sound or scent of nature—or the ability to touch it.

No one familiar with the challenges facing our prisons would claim that changing their environments is 'the answer', but there is enough evidence to suggest that the key changes proposed here, (which we know support recovery), could facilitate wider and more significant changes. Prisons need to be safer and more hopeful places for all who inhabit them. From an environmental perspective that means that they need to be calmer and quieter, enabling productive and supportive interactions between less-stressed people who can sleep well, and who can benefit from access to nature.